IN THE CLAIMS:

1. (Currently Amended) In a communication system having a first communication station and at least a second communication station, the first communication station at least operable to transmit data to the second communication station, an improvement of apparatus for the first communication station for coding the data prior to transmission thereof at the first communication station, said apparatus comprising:

a first modulator coupled to receive indications of the data to be communicated by the first communication station, said first modulator for modulating the indications of the data to form a first-modulated signal representative thereof;

a mapper coupled to said first modulator, said mapper for mapping at least a portion of the first-modulated signal formed by said first modulator to a selected dimension value selected from amongst a plurality of available dimension values;

a second modulator coupled to said mapper, said second modulator containing a set of substantially orthogonal bases, the substantially orthogonal bases of the set corresponding in dimension to the selected dimension values into which said mapper maps the at least the portion of the first-modulated signal, said second modulator for forming a second-modulated signal, the second-modulated signal of a dimension responsive to the selected dimension value into which said mapper maps the portion of the first-modulated signal the second-modulated signal forming biorthogonal codes defined by the substantially orthogonal bases that define multiple dimensional modulation data for transmission to the second communication station.

2. (Original) The apparatus of claim 1 further comprising a summer coupled to said second modulator, said summer for summing together successive portions of the second-modulated signal formed by said second modulator, thereby to form a summed signal suitable for transmission to the second communication station.

3. (Original) The apparatus of claim 1 wherein the first-modulated signal generated by said first modulator is of values selected from an antipodal value set.

4. (Original) The apparatus of claim 3 wherein said first modulator comprises a BPSK (Binary Phase Shift Keying) modulator.

5. (Original) The apparatus of claim 4 wherein the antipodal value set from which values generated by said BPSK modulator are selected comprise a logical positive one value and a logical negative one value.

6. (Original) The apparatus of claim 1 wherein the first-modulated signal is formed of successive groups of signal values, each group defining a most significant signal value and at least one least significant signal value.

7. (Original) The apparatus of claim 6 wherein the selected dimension value into which said mapper maps the portion of the first-modulated signal is responsive to values of the most significant bit and of the at least one least significant bit.

8. (Original) The apparatus of claim 7 wherein the most significant bit of each group of signal values is determinative of whether the portion of the first-modulated signal is to be of a positive value and wherein the at least one least significant bit is determinative of to which dimension value the portion of the first-modulated signal is mapped.

9. (Currently Amended) The apparatus of claim 8 wherein said mapper comprises a functional single-throw, multiple-pole ~~multi-hole~~ switch element.

10. (Original) The apparatus of claim 9 wherein said switch element comprises a one-to-2^{N-1} switch.

11. (Cancelled)

12. (Original) The apparatus of claim 1 further comprising a rotator coupled between said mapper and said second modulator, said rotator for rotating the dimension values into which said mapper maps the at least the portion of the first-modulated signal.

13. (Original) In the communication system of claim 1, a further improvement of apparatus for the second communication station for decoding the data transmitted by the first communication station tot he second communication station, said apparatus comprising:

an energy detector coupled to receive indications of the data transmitted by the first communication station and received at the second communication station, said energy detector for detecting energy levels of the indications, thereby to determine values representative of the data.

14. (Original) The apparatus of claim 13 wherein said energy detector comprises:

a normalizer coupled to receive the indications of the data received at the second communication station, said normalizer for normalizing the indications of the data and for generating a normalized representation thereof; and

a square-law device coupled to receive the normalized representations generated by said normalizer, said square-law device for forming a squared representation of the normalized representation of the indications of the data.

15. (Original) The apparatus of claim 14 wherein coordinates of the data are rotated prior to transmission thereof by the first communication station and wherein said apparatus further comprises a derotator for derotating the indications of the data received at the second communication station.

16. (Original) The apparatus of claim 1 wherein the communication system comprises a cellular radio communication system operable pursuant to a Q^2PSK (Quadrative

Quadrature Phase Shift Keying) communication scheme, and wherein said second modulator comprises bases corresponding to an 8-ary biorthogonal code.

17. (Currently Amended) In a method for communicating in communication system having a first communication system and at least a second communication station, the first communication station at least operable to transmit data to the second communication station, an improvement of a method for coding the data prior to transmission thereof at the first communication station, said method comprising:

modulating indications of the data pursuant to a binary phase shift keying modulation scheme to form first-modulated values;

mapping indications representative of at least a portion of the first-modulated values ~~data~~ to a selected dimension value selected from amongst a plurality of available dimension values; and

forming a second-modulated signal of a dimension responsive to the selected dimension value into which the indications are mapped during said operation of mapping, the second-modulated signal forming biorthogonal codes defined by substantially orthogonal bases that define multiple dimensional modulation data for transmission to the second communication station.

18. (Currently Amended) The method of claim 17 further comprising the additional operation of ~~running~~ combining together successive portions of the modulated signal formed during said operation of forming.

19. (Currently Amended) The method of claim 17 wherein said operation of forming the second-modulated signal ~~modulating~~ comprises assigning an orthogonal base of a set of substantially orthogonal bases to form the modulated signal.

20. (Original) The method of claim 19 wherein said operation of assigning is made responsive to the dimension value into which the indication is mapped during said operation of mapping.

21. (New) In a communication system having a first communication station and at least a second communication station, the first communication station at least operable to transmit data to the second communication station, an improvement of apparatus for coding the data at the first communication station prior to transmission thereof and for decoding the data at the second communication station, said apparatus comprising:

a first modulator coupled to receive indications of the data to be communicated by the first communication station, said first modulator for modulating the indications of the data to form a first-modulated signal representative thereof;

a mapper coupled to said first modulator, said mapper for mapping at least a portion of the first-modulated signal formed by said first modulator to a selected dimension value selected from amongst a plurality of available dimension values;

a rotator coupled to said mapper, said rotator for rotating the at least the portion of the first-modulated signal mapped by said mapper;

a second modulator adapted to receive the at least the portion of the first-modulated signal once rotated by said rotator, said second modulator for forming a second-modulated signal, the second-modulated signal of a dimension responsive to the selected dimension value into which said mapper maps the portion of the first-modulated signal;

a derotator embodied at the second communication station, said derotator for derotating the second modulated signal once received at the second communication stataion;

a normalizer coupled to receive indications of the second-modulated signal, once derotated by said derotator, said normalizer for normalizing the indications of the data and for generating a normalized representation thereof; and

a square-law device coupled to receive the normalized representations generated by said normalizer, said square-law device for forming a squared representation of the normalized representation of the indications of the data.